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Less is More? Think Again! A Cognitive Fluency-Based More-Less Asymmetry

in Comparative Communication

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Abstract

Differences between groups, individuals, or objects can be framed in multiple ways. One can, for instance, say that men generally earn more than women or that women generally earn less than men. Showing that these logically equivalent expressions are not psychologically equivalent, we demonstrate a robust more-less asymmetry in the use of and responses to comparative statements. More specifically, we show that people use ‘more than’ statements more often than ‘less than’ statements (Study 1); like ‘more than’ statements better (Studies 2 & 3), agree more with opinions expressed through ‘more than’ statements (Studies 4 & 5), and are more likely to consider factual ‘more than’ statements to be true (Study 6). Supporting a cognitive fluency explanation, a manipulation that makes people expect disfluency while processing ‘less than’ statements reduces this otherwise robust more-less asymmetry (Study 7). By combining comparative framing effects with cognitive fluency, the present research brings together two research fields in social cognition, shedding new light on both.

Keywords: social comparison, framing, fluency, meta-cognition, social judgment, verbal communication

Less is More? Think Again! A Cognitive Fluency-Based More-Less Asymmetry
in Evaluations, Agreements, and Judgments of Truth

If people believe that men have more humor than women, do they believe to the same extent that women have less humor than men? If they enjoy reading about older employees being more experienced than younger employees, do they enjoy reading about younger employees being less experienced just as much? And if people consider it true that one spider is more dangerous than another, do they to the same extent consider it true that the latter is less dangerous? From a logical standpoint, they should. Claiming that one entity possesses more of a characteristic than another is equivalent to claiming that the latter possesses less of the characteristic.

Yet, logical equivalence does not necessarily imply psychological equivalence. Even subtle differences in framing one and the same comparison can provoke quite different reactions (e.g. Karylowski, 1989, 1990; Srull & Gaelick, 1983; Tversky, 1977). For instance, people believe that others are more similar to them than they are to others (Srull & Gaelick, 1983). As we argue here, however, a striking comparative framing effect has slipped under the radar of social comparison researchers so far. We propose that a *more-less asymmetry* exists in how people use, perceive, and respond to otherwise equivalent comparisons. More specifically, we predict that people judge comparative texts more favorably, agree more with stated opinions about differences, and are more likely to believe verifiable comparative statements to be true, if these are framed in ‘more than’ format. Building on the cognitive fluency literature, we argue that one mechanism causing this asymmetry is that ‘more than’ statements are easier to process than ‘less than’ statements.

We first review the scarce research suggesting easier processing of ‘more than’ statements and relevant theoretical approaches. Based on a cognitive fluency framework, we then deduct predictions for the consequences of such differences in processing and outline the implications of the hypothesized more-less asymmetry, before proceeding to test our predictions.

Easier Processing of ‘More Than’ Comparative Statements?

One important theoretical framework for understanding how people respond to different comparative framings is lexical marking theory (Clark, 1969, 1970, 1974; Huttenlocher & Higgins, 1971). It posits that for bipolar dimensions, such as *good-bad*, *tall-short*, *high-low* etc., the label for the so-called *unmarked* pole – always the first in the examples – can refer to the entire dimension, while the opposite (*marked*) pole only refers to half of the dimension. For example, asking ‘how bad is the food?’ implies that the food is bad, while using the unmarked pole (‘how good is the food?’) carries no such presupposition. Lexical marking theory predicts differences between the processing of comparatives using marked versus unmarked labels. As predicted by the theory, comparative statements referring to the marked pole are more difficult to process than comparatives referring to the unmarked pole (e.g. Carpenter, 1974; Clark, 1969; Flores d’Arcais, 1970, Hunter, 1957; see, however, French, 1981).

The more-less asymmetry refers to a different phenomenon. It opposes statements that include ‘more than’ versus ‘less than’ expressions to describe how entities compare on a given characteristic referred to by the same (marked or unmarked) label. Still, lexical decision theory is relevant in this context as the availability of marked labels allows speakers to avoid constructions of the ‘less than’ type. Instead of saying ‘X is less good than Y’ one can say ‘X is *worse* than Y’, thereby turning a ‘less than’ comparison into something more akin to a ‘more than’ comparison (‘X is more bad than Y’). Apparently, people feel more comfortable using a marked pole (‘worse’) than using a ‘less than’ expression coupled with an unmarked pole.

Direct evidence that ‘more than’ statements might be easier to process than ‘less than’ statements comes from psycholinguistic research. Flores d’Arcais (1966, in Flores d’Arcais, 1970) found that participants were faster to verify the truth of ‘more than’ statements than to verify the truth of ‘less than’ statements. In studies on the perceived linguistic acceptability of comparative statements, participants indicated that statements of the ‘more than’ type ‘sounded

better' than statements of the 'less than' type (Segui & Fourment, 1979) or comparisons framed as 'X not as much as Y' (Higgins, 1977).

One reason why 'more than' comparative statements might be easier to process than 'less than' comparative statements may be the following. People tend to focus descriptions and explanations of differences on what is most salient in the situation (Kanouse, 1972) and hence stands out as the 'figure' against a less attention-grabbing background (see also Hegarty & Bruckmüller, 2013). Perceptually, the presence of an attribute is easier to perceive than its absence (Treisman & Gelade, 1980; Treisman & Gormican, 1988). In comparative contexts, therefore, the entity that possesses more of a given characteristic will generally draw more attention. Consequently, people should focus their attention on the entity that possesses more of the characteristic in question. Hence, 'more than' comparative statements might be easier to process because they more closely match how people perceive and cognitively represent an observed difference.

People might also spontaneously describe observed differences through 'more than' statements rather than other expressions, so that 'more than' statements would be more common in daily language use than 'less than statements'. A first indication that this is true comes from a simple search with Google Ngram Viewer, which provides frequencies of word combinations in all printed sources available on Google books published between the years 1800 and 2000. It reveals that 'more than' is roughly six times more common than 'less than' in the available printed sources.¹ Similarly, when Hegarty and Pratto (2001, Experiment 2) asked their participants to explain an observed group difference, they unexpectedly found that explanations focused more on the group that showed more of the respective behavior than on the group that showed less of the same behavior. As a consequence of this preference for a 'more than' comparative framing, people encounter these statements more often than 'less than' statements, and hence become even better at

processing the more familiar ‘more than’ statements. This would in turn reinforce the greater cognitive fluency of the former, triggering even more frequent use of ‘more than’, and so on.

To summarize, easier processing of ‘more than’ rather than ‘less than’ comparative statements has been empirically demonstrated. Based on perceptual and linguistic approaches, one could assume several processes that would explain this difference. These processes are not mutually exclusive, but could build on and reinforce each other. The purpose of our research, however, was to examine the *psychological consequences* of differences in *cognitive fluency* that people experience when they are confronted with ‘more than’ as compared to ‘less than’ statements.

Consequences of Cognitive Fluency

Cognitive fluency – broadly defined as the ease by which a stimulus can be perceived, processed, or retrieved – affects (social) judgments in a multitude of ways (for reviews, see Alter & Oppenheimer, 2009; Unkelbach & Greifeneder, 2013; Winkielmann, Schwarz, Fazendeiro, & Reber, 2003). Greater fluency generally provokes favorable responses, particularly if it is unexpected. When stimuli are easy to perceive or to process, people experience them as more pleasant (e.g. Reber, Schwarz, & Winkielman, 2004; Reber, Winkielman, & Schwarz, 1998; Winkielmann & Cacioppo, 2001), more persuasive (e.g. Filkuková & Klempe, 2013), and more truthful (e.g. Hansen, Dechêne, & Wänke, 2008; McGlone & Tofighbakhsh, 2000; Reber & Schwarz, 1999; but see Scholl, Greifeneder, & Bless, 2014; Unkelbach, 2007; for boundary conditions), and they weigh them more heavily in their thinking (Shah & Oppenheimer, 2007).

For instance, people judge easy-to-pronounce name bearers more favorably than difficult-to-pronounce name bearers (Laham, Koval, & Alter, 2012), more readily believe statements made by bearers of easy-to-pronounce names (Newman et al., 2014), and evaluate essays written in a legible handwriting more favorably than essays written in a less legible handwriting (Greifeneder et al., 2010). Even the effect of imagined pleasant contact with an outgroup

member has been shown to depend on fluency experiences during the imagined contact, with high fluency reducing prejudice and low fluency potentially enhancing it (West & Bruckmüller, 2013).

The assumed underlying process is that people use their meta-cognitive experience of easy (or difficult) processing – and particularly the positive (or negative) affect associated with it (Topolinski & Strack, 2009) – as information (Schwarz, 2004). For example, when judging how credible a source is, they might ask themselves how they feel about the source. If they experience a subtle negative feeling, they rate the source as less credible – not realizing that this feeling was not caused by the credibility of the source, but by the difficulty they experienced when pronouncing this person's name (Laham et al., 2012). We assume that people will similarly draw on meta-cognitive experiences of fluency or disfluency while processing 'more than' and 'less than' statements when they judge the respective statements. As a consequence, framing a comparison as 'X more than Y' versus 'Y less than X' should influence subsequent judgment in a number of predictable ways.

Present Research and Predictions

Inspired by research showing that people prefer more fluently processed stimuli over stimuli that are more difficult to process (e.g., Laham et al., 2012; Reber et al., 2004; Winkielmann & Cacioppo, 2001) we hypothesized that people prefer a 'more than' over a 'less than' framing in their own comparisons and in their evaluation of comparisons stated by others. Based on studies showing that people find statements more persuasive (Filkuková & Klempe, 2013) and are more likely to believe them (e.g., Newman et al., 2014; Reber & Schwarz, 1999) if they can process them more fluently, we also predicted that they would agree more with 'more than' statements and that they would more often judge them as true.

Studies 1a and 1b tested the hypothesis that people spontaneously *use* 'more than' rather than 'less than' statements. In Study 1a, participants wrote about differences between men and

women. In Study 1b, they compared an individual with other people. Studies 2 and 3 tested the hypothesis that people *evaluate* ‘more than’ statements more favorably than ‘less than’ statements in texts comparing social groups (Study 2) or products (Study 3). Studies 4 and 5 tested the hypothesis that people *agree* more with ‘more than’ statements than with ‘less than’ statements. Study 6 tested the hypothesis that factual ‘more than’ statements are more often *considered true* than ‘less than’ statements. Finally, Study 7 tested the fluency explanation of these effects by employing an intervention that in previous research reduced the effects of cognitive fluency on judgment (e.g., Bornstein & D’Agostino, 1994). We hypothesized that providing participants with an alternative explanation for the experience of disfluency while processing ‘less than’ comparisons would reduce the more-less asymmetry.

To our knowledge, this set of studies is not only the first to examine a more-less asymmetry in the use of and responses to comparative statements (beyond simple differences in linguistic acceptability or speed of processing). It is also the first to theoretically and empirically combine effects of comparative framing with the effects of cognitive fluency, thus linking two well-established bodies of research in social cognition. Accordingly, demonstrating that the simple difference between a ‘more than’ vs. a ‘less than’ framing has the same effects as are commonly caused by differences in fluency – and demonstrating cognitive fluency as (one of) the underlying mechanism(s) – would have implications beyond the specific differences in comparative framing and the specific consequences in social judgment tested here.

Study 1a

To test the hypothesis that people spontaneously tend to frame comparative statements in ‘more than’ rather than ‘less than’ fashion, we asked participants to consider differences between men and women and to write about them in their own words.

Method

Participants. Ninety-two women and 82 men (mean age = 30.70 years, $SD = 13.50$) approached in public places in a medium-size city in Germany volunteered to complete a questionnaire on “people’s perceptions of gender differences”.

Materials, procedure, and design. The questionnaire asked participants to think about similarities and differences between men and women and to describe some differences in their own words. They also indicated how much they thought men and women differed in general (from 1 = *not at all* to 9 = *very much*) and listed an area in which they thought a difference existed. We counterbalanced the direction of the comparison. Some participants were asked to think about how men differ from women, while others were asked to think about how women differ from men. We introduced this control because the direction of comparison has been shown to affect social judgments (Tversky, 1977; for a review see Wänke & Reuter, 2010), including the framing of gender differences (Bruckmüller, Hegarty, & Abele, 2012). We also counterbalanced the order of questions, asking some participants to rate how much men and women differed before they wrote about the differences and some to write about the differences before they gave this general rating. Finally, all participants indicated their age, gender, and current profession before they were thanked, debriefed, and offered to leave their contact details to receive more information.

Results

Coding and descriptives. Fifteen participants did not provide codable statements; they either left the response blank or wrote down one or two words that could not be coded with regard to the categories below. Together, the remaining participants wrote down 435 codable statements (1 to 9 statements per participant). On average, participants made 2.41 statements ($SD = 1.68$). Each statement was coded by two independent judges blind to hypothesis and condition. They coded (1) whether the statement was about women, about men, (2) whether it attributed a desirable, undesirable, or neutral/ambiguous characteristic to the respective group, and (3)

whether it was worded absolutely versus comparatively. A response was coded as comparative if it included an expression such as ‘more than’, ‘less than’, ‘as... as’, ‘as compared to’, or if it included a superlative. For comparative statements the judges also coded (4) whether the comparison referred to a similarity or a difference, and (5) whether differences were described in a ‘more than’ or a ‘less than’ fashion. The ‘difference’ category was of central importance in this study.

Judges overall agreed on 91.1% of their codes (96.2% for the critical ‘more than’ versus ‘less than’ category). Since disagreements on desirability ratings were relatively frequent (28.4%) a third judge was consulted to resolve those disagreements. For the remaining categories disagreements were resolved by discussion between the two primary judges. Of all responses, 176 (40.5%) focused on women, and 189 (43.5%) focused on men (with the remainder having no clear focus).² Ninety-one statements (20.9%) referred to a desirable and 103 (23.7%) to an undesirable characteristic, with the remainder being coded as neutral or ambiguous. Furthermore, 212 (48.7%) statements made by 103 participants were worded comparatively; of these, all but one (211 or 99.5%) identified a difference.

Main analysis. The participants who described at least one difference framed most differences in a ‘more than’ format, namely, 83.4% ($SD = .34$). This is higher than the 50% one would expect if participants had no preference for a specific framing, $t(102) = 10.09, p < .001$, thus confirming our main prediction. This effect occurred for statements referring to desirable ($M = .89, SD = .33$), undesirable ($M = .96, SD = .11$), and ambiguous characteristics ($M = .78, SD = .36$), $t_s > 3.75, p_s \leq .001$, and there were no effects of the two counterbalancing variables, $F_s(1, 99) < 1.66, p_s > .20$.

Discussion

Study 1a provided first evidence that when describing differences between groups, people prefer to use comparisons of a ‘more than’ rather than a ‘less than’ type. They do so regardless of

whether the comparison dimension is desirable, undesirable, or ambiguous, and regardless of the group the comparison focuses on. Yet, Study 1a is limited in a number of ways. First, we asked participants to write about *differences*, which might not be equivalent to spontaneous everyday comparisons that may include similarities as well. Second, participants compared social groups. This may imply a specific type of comparison because (among other reasons) people can draw on stereotypes that they have about the respective groups. Study 1b therefore extended our research by evoking comparative statements about individuals, including similarities as well as about differences.

Study 1b

Study 1b tested the prediction that when comparing an individual to others, people focus on characteristics that the individual has more than others to the expense of characteristics that the individual has less. To test this prediction, we had participants compare an individual's personality (self or a friend) to others' personalities (a group of friends). Importantly, we asked them to 'compare' the target and the referent group rather than asking for differences. We instructed participants to list desirable traits, undesirable traits, or gave no particular instruction on trait valence to ensure a wide range of comparative statements. We predicted that where participants mentioned differences, 'more than' statements would outnumber 'less than' statements – regardless of whether participants compared the self or a friend to others and regardless of the desirability of the comparison dimension.

Method

Participants. Two hundred thirty-two students (49 men and 173 women, $M_{age} = 18.84$ years, $SD_{age} = 1.133$ years, age range: 18-25 years; ten participants did not indicate their age and gender) completed a brief questionnaire as part of a classroom exercise.

Materials, procedure, and design. All participants received a single-sheet questionnaire. The written instructions stated that we were interested in how people compare

personalities. Approximately half of the participants were instructed to compare themselves to their friends. They were asked to list ten personality traits and to specify how they compared on them (target = self). The other half of the participants were instructed to compare one friend to their other friends by listing ten personality traits and specifying how this friend compared on them (target = friend). Participants were asked to select a same-sex friend who was not their best friend and to keep the same target in mind throughout the task.

The instructions encouraged participants to list ten traits but reassured them that they should just try their best, even if they could not list ten. The instructions furthermore encouraged approximately one third of participants to list desirable traits (instruction = desirable), one third to list undesirable traits (instruction = undesirable), and one third to list any kind of trait (instruction = unspecified).

Results

Coding and descriptives. Seven participants wrote down at least one statement that was uncodable because it was unreadable (1 statement), not following instructions (13 statements; e.g., a statement about the self in the friend-condition), or so nuanced that several categories applied (1 statement). As all these participants also provided several statements that could be coded we dropped uncodable statements without dropping the respective participants altogether.

The final set of statements totaled 1577. On average, participants listed 6.80 elements ($SD = 2.37$). Two judges blind to the hypothesis and to conditions coded the statements using the categories of Study 1a except for the focus on women versus men. Judges completely agreed in 74% of all statements. A third judge solved disagreements. The majority of statements could be categorized as desirable (873; or 55.4%) or undesirable (484, or 30.7%).³ Most statements were comparatively worded (1157, 73.4%) of which the majority identified a difference (1034, 89.4% of all comparatively worded statements).

Main analysis. Participants framed most differences in a ‘more than’ format, namely, 76.4% ($SD = .24$). This is higher than the 50% one would expect if participants had no preference for a specific framing, $t(197) = 15.42, p < .001$. This finding confirms our main prediction.

To test for potential effects of the between-subjects variables target (self, friend) and instruction (desirable, undesirable, unspecified) we conducted an ANOVA on the proportion of ‘more than’ differences. We found main effects of target, $F(1, 192) = 11.55, p = .001, \eta^2 = .06$, and instruction, $F(2, 192) = 3.11, p = .047, \eta^2 = .03$, and a target by instruction interaction, $F(2, 192) = 3.29, p = .039, \eta^2 = .03$. Participants more often used ‘more than’ expressions when comparing a friend ($M = 0.83, SD = 0.25$) than when comparing the self ($M = 0.71, SD = 0.22$); they also listed a greater number of ‘more than’ differences in the unspecified and the desirable characteristics condition ($M = 0.79, SD = 0.22$ in both cases) than in the undesirable characteristics condition ($M = 0.70, SD = 0.28$). The instruction affected the proportion of ‘more than’ expressions in the friend-condition ($M_{unspecified} = 0.84, SD = 0.21$; $M_{desirable} = 0.91, SD = 0.18$; $M_{undesirable} = 0.70, SD = 0.32$; a Tukey test revealed a difference at $p < .05$ between the latter two conditions) but not in the self-condition ($M_{unspecified} = 0.73, SD = 0.22$; $M_{desirable} = 0.69, SD = 0.20$; $M_{undesirable} = 0.70, SD = 0.25$; no significancies). Importantly, however, the proportion of ‘more than’ expressions exceeded the chance level for all target-instruction combinations: $ts(23 \text{ to } 36) > 3.00, ps \leq .005$.

Discussion

People prefer to use ‘more than’ rather than ‘less than’ expressions when describing differences between an individual and a group as well as when describing differences between groups (Study 1a). Overall, ‘more than’ statements outnumbered ‘less than’ statements with a ratio of roughly 3:1 (or even 5:1 in Study 1a). Participants gravitated towards using ‘more than’ statements regardless of the target whom they compared to a group (the self versus someone

else) and regardless of whether they were asked (or not) to focus on desirable or undesirable characteristics. Both target and valence instruction did affect the strength of the tendency to use ‘more than’ statements rather than ‘less than’ statements. However, their influence was merely a matter of degree, and we found a robust more-less asymmetry overall.

Study 2

Study 2 tested the prediction that people evaluate a message involving ‘more than’ statements more favorably than a message involving ‘less than’ statements. Participants read a newspaper article about differences between older and younger employees. The article included comparative statements of either the ‘more than’ or the ‘less than’ type. Participants judged the article and its author. We predicted that they would judge the article more favorably when it included ‘more than’ statements than when it included ‘less than’ statements.

Method

Participants. One hundred Dutch-speaking Belgian students (54 women, 46 men), aged 18 to 20 ($M = 18.5$, $SD = .64$) took part to fulfill a course requirement.

Materials, procedure, and design. Participants were welcomed in groups of 3 to 10 for a study on how people evaluate press articles. They were seated in cubicles and received a booklet that contained all stimuli and questions. The instructions encouraged participants to closely read the article before answering the questions, to which there were no right or wrong answers.

The (Dutch) article was based on an article that had appeared in a newspaper a few months earlier and that dealt with job attitudes of younger and older employees. Its message was that the two groups, while resembling each other in many respects, differed on a number of dimensions. We shortened the article and added comparative statements. The title read “Young or old? Everyone wants useful employment”. The introductory lines described a survey about job attitudes, presenting some of the similarities between younger and older employees that it had

revealed. Both groups allegedly desired to strike a balance between work and private life, wanted useful, meaningful work that earned them recognition and respect, and hoped for job security and little stress. In the ‘more than’ condition the article then continued: ‘Older employees find loyalty to their employer more important than younger employees. They are generally more satisfied with their salary and they more often hold work ethics that prescribe them to try and do their job even in difficult circumstances (such as in case of mild illness or family troubles). Moreover, older employees value good relationships with their colleagues more strongly.’ In the ‘less than’ condition the article contained the same information framed in a ‘less than’ format (e.g. ‘Younger employees find loyalty to their employer less important than older employees’). In both conditions, the article concluded with the statement that although human resources managers should not think in categories they should take age differences into account.

Participants then evaluated the article. They responded to five items about the title (“The title... is clear/encourages further reading/summarizes the contents well/is original/is beautiful”; Cronbach’s $\alpha = .67$), eight about the content (“The content... is convincing / balanced / engaging / thought-provoking / interesting / believable / objective / important”, $\alpha = .73$), eight about the writing (“The article.... is well structured / is logically organized / is fun to read / is fluently written/is easy to understand / has an engaging style/ uses correct language / has the right length”, $\alpha = .71$), and six about the author (“The author is probably... knowledgeable / unprejudiced / trustworthy / honest / likable / experienced”, $\alpha = .68$). They indicated their agreement by circling an alternative on a scale from -3 (totally disagree) to $+3$ (totally agree).

Results and Discussion

We calculated scale means and subjected them to a repeated measures ANOVA with judgment (title vs. content vs. writing vs. author) as a within-subjects variable and framing (more versus less) as a between-subjects variable. As predicted, there was a main effect of framing, $F(1, 98) = 10.20, p = .002, \eta_p^2 = 0.09$. Participants liked the article better when it included ‘more

than' comparisons ($M = 0.43$, $SD = 0.40$) than when it included 'less than' comparisons ($M = 0.13$, $SD = 0.53$). We also found a main effect of judgment, $F(3, 294) = 68.96$, $p < .001$, $\eta_p^2 = 0.41$. Participants liked the writing best ($M = 0.67$, $SD = 0.58$), followed by the content ($M = 0.54$, $SD = 0.69$), the author ($M = 0.21$, $SD = 0.60$), and the title ($M = -0.32$, $SD = 0.80$). Framing did not interact with judgment, $F < 1$.

Obviously, participants liked the message better when it included 'more than' statements than when it included 'less than' statements. This effect was sufficiently strong to affect judgments of an article that for a considerable part described similarities. Yet, one limitation of Study 2 was that it may have accidentally presented older employees as better than younger ones (at least from the point of the view of the employer). As such, the 'more than' statements may have seemed to focus on a desirable target whereas the 'less than' statements may have seemed to focus on an undesirable target. To the extent that people prefer messages that focus on desirable things over messages that focus on undesirable ones, the observed framing effect might be a desirability effect in disguise. We addressed this limitation in Study 3.

Study 3

Study 3 again tested the prediction that people evaluate a message involving 'more than' statements more favorably than a message involving 'less than' statements. Participants read a fabricated article comparing two allergy medicines through a description of their effects and side-effects. Using either 'more than' or 'less than' comparisons, the article mentioned both strengths (effects) *and* weaknesses (side-effects) of *both* medicines. Hence, it did not present one medicine as superior. To extend our test of the more-less asymmetry beyond ratings on predefined scales, Study 3 also included two open-ended questions about the strengths and weaknesses of the article. We expected that participants would list more strengths and/or fewer weaknesses for the 'more than' article than for the 'less than' article.

Method

Participants. Two hundred and five Dutch-speaking Belgian students (146 women, 55 men), aged 17 to 49 ($M = 19.37$, $SD = 3.05$) took part in a classroom demonstration of research methods in the social psychology of communication.

Materials and procedure. Participants took part during a lecture. After students were informed that participation was voluntary, questionnaires were handed out and participants filled them out at their own pace. Class attendance not being obligatory, no precise response rate could be calculated. Yet, almost all students present chose to participate.

The stimulus text was an article (in Dutch) that was allegedly written at the occasion of an impending decision by a health insurance policy committee about the reimbursement of two (fictitious) medicines Xylon and Medovan, both developed in European laboratories. Both were described as medicines which clinical trials had proven effective against symptoms of allergies to pollen and dust mites. In the ‘more than’ condition, one medicine was described as more effective against headaches and teary eyes, and the other as more effective against symptoms of the respiratory system. One medicine was also described as being more quickly absorbed and hence working faster whereas the other was described as having a more prolonged effectiveness and hence being easier to use. Concerning side-effects, absentmindedness had allegedly been reported more often in the case of one medicine (so that driving was to be more urgently discouraged) whereas stomach upset had been reported more frequently in the case of the other (so that its use by patients with digestive problems was to be more urgently discouraged). The article ended by noting that the medicines were similarly priced and that it was unclear which one, if not both, health insurances would reimburse. In the ‘less than’ condition the article included the same information except that all differences were framed in ‘less than’ style.

The dependent variables were borrowed from Study 2. To check whether participants viewed the two medicines equally favorably we also asked participants to rate how the author viewed each medicine on a scale from -3 (very unfavorably) to $+3$ (very favorably). Finally, we

asked participants to imagine that they advised the article's author. We asked them to list things they thought the author had done particularly well and things the author could have done better.

Design. We manipulated framing ('more than', 'less than') between participants. The combination of specific (side-)effects with one of the medicines was counterbalanced. Evaluation dimension (title, contents, writing, author) was a within-subjects variable.

Results

Inferred view of the medicines. A repeated measures ANOVA with medicine as a within-subjects variable and combination and framing as between-subjects variables tested whether participants thought that the author considered both medicines equally valuable. Participants thought that the author viewed Xylon a bit more favorably ($M = 0.32$; $SD = 0.79$) than Medovan ($M = 0.21$; $SD = 0.76$), $F(1, 201) = 3.53$, $p = .06$, $\eta_p^2 = 0.02$. Importantly, however, medicine did not interact with framing and/or combination, all F 's $< .01$. It seems, then, that we successfully created two equivalent medicines to be compared via 'more than' vs. 'less than' statements. One unexpected but intriguing finding was an effect of framing, $F(1, 203) = 14.27$, $p < .001$, $\eta_p^2 = 0.07$. Participants thought that the author viewed both medicines more favorably when the article included 'more than' statements ($M_{Xylon} = 0.49$; $SD = 0.76$; $M_{Medovan} = 0.38$; $SD = 0.74$) than when it included 'less than' statements ($M_{Xylon} = 0.15$; $SD = 0.80$; $M_{Medovan} = 0.04$; $SD = 0.74$).

Evaluation of the article. We calculated scale means (title: $\alpha = .76$, content: $\alpha = .78$, writing: $\alpha = .85$, author: $\alpha = .79$) and subjected them to a repeated measures ANOVA with judgment (title vs. content vs. writing vs. author) as a within-subjects variable and framing (more vs. less) as a between-subjects variable (scale means in Figure 1). We found main effects of framing, $F(1, 202) = 9.22$, $p = .003$, $\eta_p^2 = 0.04$, and judgment, $F(3, 606) = 98.31$, $p < .001$, $\eta_p^2 = 0.33$, and a framing by judgment interaction, $F(3, 606) = 5.04$, $p = .002$, $\eta_p^2 = 0.02$. Participants liked the 'more than' article better ($M = 0.48$, $SD = 0.59$) than the 'less than' article ($M = 0.24$,

$SD = 0.51$). They liked the content best ($M = 0.71$, $SD = 0.72$), followed by the author ($M = 0.53$, $SD = 0.69$), the writing ($M = 0.51$, $SD = 0.82$), and the title ($M = -0.29$, $SD = 0.92$). The more-less difference was significant for content, $t(203) = 3.27$, $p = .001$, and writing, $t(203) = 4.31$, $p < .001$, but not for title, $t(202) = 0.95$, $p = .345$, and author, $t(203) = 0.26$, $p = .792$.

 Insert Figure 1 about here

Strengths and weaknesses. To examine perceived strengths and weaknesses of the article, we first tallied how many participants in each condition answered the open questions. More participants listed strengths in the ‘more than’ condition (69.5%) than in the ‘less than’ condition (52.0%), $\chi^2(1, N = 205) = 6.61$, $p = .010$, while weaknesses were listed by somewhat more participants in the ‘more than’ condition (61.0%) than in the ‘less than’ condition (73.0%), $\chi^2(1, N = 205) = 3.35$, $p = .067$. Hence, ‘more than’ statements provoked more praise and somewhat less criticism than ‘less than’ statements.

We also examined how extensively participants described strengths and weaknesses by counting the number of words. We counted symbols replacing words (e.g. ‘&’ to replace ‘and’) as separate words and abbreviations for as many words as they represented. We subjected the numbers to a repeated measures ANOVA with valence (strengths vs. weaknesses) as a within-subjects variable and framing (more vs. less) as a between-subjects variable, including all participants who wrote down at least one strength, one weakness, or both. We found a main effect of valence, $F(1, 162) = 11.78$, $p = .001$, $\eta_p^2 = 0.07$, qualified by a valence by framing interaction, $F(1, 162) = 5.58$, $p = .019$, $\eta_p^2 = 0.03$. In the ‘less than’ condition, participants used more words to describe weaknesses ($M = 6.17$; $SD = 4.50$) than to describe strengths ($M = 3.43$, $SD = 3.58$), $t(82) = 4.48$, $p < .001$, while there was no such difference in the ‘more than’ condition, ($M_s = 5.06$ and 4.49 , $SD_s = 5.09$ and 3.54 , respectively), $t(80) = 0.70$, $p = .485$.

Not a single participant in the ‘more than’ condition mentioned the ‘more than’ comparisons as a strength, and no more than three participants in the ‘less than’ condition mentioned the ‘less than’ comparisons as a weakness. Participants frequently mentioned strengths such as the article being succinct, informative, clear, and balanced, and weaknesses such as the article being poorly structured, written in a boring and/or difficult style, or having a bad title. This suggests that the differential cognitive fluency associated with ‘more than’ and ‘less than’ statements provoked a subtle feeling of ease or discomfort, respectively, without participants being able to identify its source.

Discussion

Study 3 replicated, corroborated, and extended Study 2. It showed that people like a message better when it includes ‘more than’ statements than when it includes ‘less than’ statements. It also refuted the alternative interpretation of Study 2 that participants might like an article focusing on a desirable target better than an article focusing on an undesirable target. Both articles described the two medicines with desirable and undesirable characteristics. Furthermore, Study 3 showed that participants listed strengths more often and weaknesses somewhat less often when the article included ‘more than’ statements, showing that the more-less asymmetry is not restricted to evaluative ratings on rating scales. Moreover, participants in the ‘less than’ condition, but not those in the ‘more than’ condition, used more words to describe weaknesses than to describe strengths.

Again, then, we found clear and consistent support for a more-less asymmetry in evaluation. Hence, the following studies turned away from effects of a ‘more than’ or ‘less than’ framing on evaluation. They proceeded to test our hypothesis regarding a different consequence of an easier processing of ‘more than’ rather ‘less than’ comparative statements, namely, that the former would garner higher agreement than the latter.

Studies 4a and 4b

Studies 4a and 4b tested our hypothesis of a more-less asymmetry in agreement with comparative statements. We asked participants how much they agreed with statements about men and women (Study 4a) or about younger and older people (Study 4b). Half of the statements were of the ‘more than’ type, half were of the ‘less than’ type. We manipulated the valence of the comparison dimension so that the statements were either about desirable or about undesirable characteristics. As a consequence, ‘more than’ statements about desirable dimensions described the target relatively desirably (and the referent relatively undesirably) whereas ‘more than’ statements about undesirable dimensions described the target relatively undesirably (and the referent relatively desirably) – and vice versa for ‘less than’ statements. For instance, an item with a ‘more than’ frame could read ‘men act more ambitiously than women’ (desirable dimension, hence describing the target relatively desirably) or ‘men show more false modesty than women’ (undesirable dimension, describing the target relatively undesirably).

In Study 4a we also manipulated the stereotype-consistency of the statements so that half of them were stereotype-consistent (‘male’ characteristics attributed to men more than to women, or to women less than to men; ‘female’ characteristics attributed to women more than to men, or to men less than to women), while the other half was stereotype-inconsistent. In Study 4b the statements were irrelevant to stereotypes about younger and older people because they were based on the same stem as the gender-stereotypic statements in Study 4a.

Method

Participants. Participants in Study 4a were 320 Dutch-speaking Belgian students (234 women, 86 men), aged 17 to 24 ($M = 18.42$, $SD = 1.07$). Participants in Study 4b were also 320 Dutch-speaking Belgian students (273 women, 45 men), aged 16 to 38 ($M = 18.31$, $SD = 1.52$). All took part to fulfill a course requirement.

Materials and procedure. Participants were welcomed in groups of about 20 to a survey study ‘on views about men and women’ (Study 4a) or ‘on views about younger and older people’ (Study 4b). They received a booklet containing all instructions and items. Participants indicated to what extent they agreed with 104 comparative statements about men and women (Study 4a) or younger and older people (Study 4b). They answered on a response scale ranging from 1 (fully disagree) to 7 (fully agree). Within each questionnaire half of the statements were of the ‘more than’ type and half were of the ‘less than’ type (framing: ‘more than’ versus ‘less than’). Half were derived from characteristics that popular books on gender differences attribute to men whereas the other half was derived from characteristics that these books attribute to women (stereotype: male versus female). Half of the statements were consistent with gender stereotypes whereas the other half were inconsistent with these stereotypes (consistency: consistent versus inconsistent). Finally, 72 statements were about desirable and 32 statements were about undesirable characteristics.⁴ The desirable statements outnumbered the undesirable ones because in pretests we found many more desirable characteristics than undesirable characteristics being attributed to men and women.

Design. The independent variables (framing, desirability, source of stereotype, consistency) were manipulated within subjects. Still, each participant responded to every characteristic only once. We construed different questionnaires so that across participants, each characteristic appeared equally often in stereotype-consistent and -inconsistent and in ‘more than’ and ‘less than’ statements. Half of the participants received a questionnaire that started with items from the male stereotype whereas the other half received a questionnaire that started with items from the female stereotype. Within these categories, participants first responded to desirable and then to undesirable characteristics. Within each stereotype-valence category, the first half or the second half of the statements were stereotype-consistent. Within each stereotype-valence-consistency category either the first half consisted of ‘more than’ statements or the first

half consisted of ‘less than’ statements. Statements were thus presented in blocks, with independent variables varying between blocks and with the order of the blocks being counterbalanced between participants.

Results

Study 4a. We calculated mean agreement ratings per framing, desirability, and consistency, and subjected them to an ANOVA with framing (‘more than’ vs. ‘less than’), desirability (desirable vs. undesirable), and consistency (consistent vs. inconsistent), as within-subjects variables and participant gender as a between-subjects variable.

As predicted, there was a main effect of framing, $F(1, 318) = 272.35, p < .001, \eta_p^2 = 0.46$. Participants agreed more with statements of the ‘more than’ type ($M = 3.82, SD = 0.52$) than with statements of the ‘less than’ type ($M = 3.42, SD = 0.50$). Framing was involved in interactions with desirability, $F(1, 318) = 14.06, p < .001, \eta_p^2 = 0.04$, participant gender, $F(1, 318) = 4.61, p = .032, \eta_p^2 = 0.01$, and desirability and participant gender, $F(1, 318) = 4.41, p = .036, \eta_p^2 = 0.01$. Figure 2 shows the mean ratings for the cells of the three-way interaction. The more-less difference was larger for undesirable characteristics than for desirable characteristics. For desirable characteristics, it was greater among women ($M_{dif} = 0.39, SD = 0.37$) than among men ($M_{dif} = 0.20, SD = 0.38$), $t(318) = 4.01, p < .001$, whereas for undesirable characteristics no such difference occurred (women: $M_{dif} = 0.46, SD = 0.59$; men: $M_{dif} = 0.45, SD = 0.60$), $t(318) = 0.09, p = .93$. Importantly, however, the more-less difference was significant in all cases, all $ts > 4.80$, all $ps < .001$.⁵

Insert Figure 2 about here

Study 4b. We analyzed the data as in Study 4a.⁶ We once more found a main effect of framing, $F(1, 314) = 91.74, p < .001, \eta_p^2 = 0.23$.⁷ Statements of the ‘more than’ type met with

greater agreement ($M = 3.74$, $SD = 0.59$) than statements of the ‘less than’ type ($M = 3.48$, $SD = 0.55$). There was also an interaction of framing and ‘consistency’, $F(1, 314) = 4.83$, $p = .029$, $\eta_p^2 = 0.02$. Statements of the ‘more than’ type consistently met with greater agreement than statements of the ‘less than’ type, but the difference was greater for statements attributing ‘male’ characteristics to younger or ‘female’ characteristics to older people ($M_{more} = 3.81$, $SD = 0.66$; $M_{less} = 3.59$, $SD = 0.61$), $t(319) = 9.30$, $p < .001$, $d = 0.35$, than for statements attributing ‘female’ characteristics to younger or ‘male’ characteristics to older people ($M_{more} = 3.67$, $SD = 0.59$; $M_{less} = 3.38$, $SD = 0.56$) $t(319) = 13.59$, $p < .001$, $d = 0.50$.

Discussion

Study 4a and Study 4b provided support for our hypothesis that participants would agree more with the same comparisons if these were framed as ‘more than’ rather than ‘less than’ statements. Participants showed a more-less asymmetry in their agreement with statements about differences between social groups regardless of the groups being compared (men and women or younger and older people), the differences being plausible (stereotype-consistent) or implausible (i.e. stereotype-inconsistent), and the desirability of the comparison dimension.

However, the study had three limitations. First, participants alternately judged ‘more than’ statements and ‘less than’ statements. Our design was thus vulnerable to demand characteristics. We a priori deemed these unlikely. The questionnaire included desirable and undesirable statements and in Study 4a stereotype-consistent and stereotype-inconsistent statements. These differences should be more conspicuous than the more-less difference. Still, we cannot fully exclude that demand characteristics might have enhanced the hypothesized more-less asymmetry. Second, participants responded to a large number of statements. This may have caused fatigue, boredom, or both. Of course, a phenomenon that emerges despite these circumstances (or that would emerge in these circumstances only) would still be interesting. Before drawing firm conclusions, however, we wanted to replicate the phenomenon under

circumstances that did not discourage participants from carefully responding to each single item. Third, we found a consistency effect in Study 4b. This was unexpected because even if participants associated femininity with old age and masculinity with young age, it would seem that the consistency should have been stronger in Study 4a were the statements were about men and women. One explanation, albeit an implausible one, might be that the statements were not as clearly about ‘typically male’ and ‘typically female’ characteristics as we had intended them to be. We addressed all these issues in Study 5, in which participants responded to a smaller number of statements that were each selected to be about a highly stereotypical ‘male’ or ‘female’ characteristic and in which we manipulated the ‘more than’ versus ‘less than’ expression of the described gender differences between subjects.

Study 5

Participants expressed their agreement with a small number of statements about gender differences. These statements were about desirable and undesirable characteristics that were selected from the statements in Study 4a to represent highly gender stereotypical characteristics. We manipulated framing between participants. Half of the participants responded to statements of the ‘more than’ type whereas the other half responded to statements of the ‘less than’ type. We expected greater agreement in the ‘more than’ condition than in the ‘less than’ condition.

Method

Participants. Participants were 60 Dutch-speaking Belgian students (49 women, 11 men), aged 17 to 24 ($M = 18.62$, $SD = 1.22$) who took part to fulfill a course requirement.

Materials and procedure. Participants were welcomed in groups of 4 to 10 and received a questionnaire ‘on views about men and women’. They were asked to indicate to what extent they agreed with each of 20 comparative statements about men and women, using a response scale that ranged from 1 (fully disagree) to 7 (fully agree). The items were selected from Study 4a. On the basis of manipulation check data we had collected for Study 4a, we selected 10 ‘male’

and 10 ‘female’ characteristics (stereotype: male vs. female). There were 5 desirable and 5 undesirable in each category, and the categories were balanced for the extremity of ‘gender-typicality’ and valence. We manipulated stereotype-consistency between participants. For half of the participants the statements were consistent with gender stereotypes whereas for the other half they were incongruent with them. Most importantly, we also manipulated framing between participants. Half of the participants responded to ‘more than’ statements and the other half responded to ‘less than’ statements.

Design. Our manipulations resulted in a 2 (framing: ‘more than’ vs. ‘less than’) by 2 (stereotype-consistency: consistent vs. inconsistent) by 2 (desirability: desirable vs. undesirable) design, with framing and stereotype-consistency being manipulated between subjects and desirability being manipulated within subjects.

Results and Discussion

We calculated mean agreement ratings and subjected them to an ANOVA with framing and stereotype-consistency as between-subjects variables and desirability as a within-subjects variable.⁸ Again demonstrating a more-less asymmetry, the ANOVA yielded a main effect of framing, $F(1, 56) = 9.04, p = .004, \eta_p^2 = 0.14$. Participants agreed more with ‘more than’ statements ($M = 4.08, SD = 0.74$) than with ‘less than’ statements ($M = 3.56, SD = 1.06$). Importantly, framing interacted with neither desirability, $F(1, 56) = 0.91, p = .76$, nor stereotype-consistency, $F(1, 56) = 0.49, p = .49$. Thus, participants agreed more with ‘more than’ than with ‘less than’ statements regardless of the desirability of the comparison dimension and regardless of the stereotype-consistency of the statements.⁹ Perhaps even more importantly, they agreed more with ‘more than’ comparisons than with equivalent ‘less than’ comparisons in a design that precluded demand characteristics and participant fatigue. Study 5 thus provided strong support for a more-less asymmetry in agreement with statements about social groups.

Study 6

Study 6 moved away from the more-less asymmetry in agreement with stated opinions. Instead, it tested the hypothesis that a more-less asymmetry also occurs in judgments of truth. We tested the prediction that participants are more likely to believe that factual statements about differences are true if the differences are framed in ‘more than’ rather than ‘less than’ style. We again used statements about gender differences. This time, however, the comparisons referred to non-gender-stereotypic characteristics (so that participants could not draw on stereotypes), and to more specific and more objectively measurable factual matters rather than to the generalized and often rather subjective opinions expressed in gender stereotypes.

Method

Participants. Forty women and 39 men (mean age = 31.20, $SD = 13.63$) were recruited at two different train stations in southern Germany. One additional participant had to be excluded because of too much missing data (only 2 out of 12 critical items answered).

Materials and procedure. Participants were asked to complete a ‘gender differences quiz’. Their task was to guess whether twelve statements about gender differences were true or false. To ensure that they could not draw on gender stereotypes, we conducted a pretest to find areas in which it would be difficult to guess if a gender difference actually existed. For this pretest, we obtained a list of items from a German market research institute for which a recent representative survey had found no gender differences. We borrowed 20 items referring to everyday activities (e.g., *listening to the radio; owning pet fish*) and to stated attitudes (e.g., *willingness to spend money for higher quality*). For each item, 38 female and 6 male introductory psychology students ($M = 22.1$ years, $SD = 3.6$) guessed if there was a gender difference (by checking *yes* or *no*, and if *yes*, to which gender group the item applied more). We selected 12 items for which (1) at least 40% of participants felt there was no gender difference, and (2) among the participants who did see a difference, opinions were divided as to whether the item mainly applied to women or to men. Six statements had a

‘more than’ framing (e.g., *men more often own pet fish than women do*) and six had a ‘less than’ framing (e.g., *men go to the cinema less often than women do*). We counterbalanced which statements appeared in which frame. We also counterbalanced whether the statements compared men to women or women to men. We asked participants per statement (1) to guess whether it was true or not (dichotomous choice), and (2) to indicate how certain they were of their answer (1 = not at all; 7 = completely).

Results

Judgments of truth. We first calculated the proportion of ‘more than’ and ‘less than’ items guessed to be true. For participants who left at least one item blank ($N = 6$), we calculated the proportion based on the number of items that they had answered. Overall, participants were more likely to guess that the statements were false than they were to believe them to be true (mean proportion guessed to be true = .36, $SD = .15$), $t(78) = 8.06$, $p < .001$, $d = .93$. This is not surprising given that all statements claimed a difference in an area where a survey had found no differences. Most importantly, a 2 (framing: ‘more than’ vs. ‘less than’) by 2 (participant gender: female vs. male) ANOVA with framing being manipulated within subjects revealed a main effect of framing, $F(1, 77) = 14.54$, $p < .001$, $\eta^2_p = .16$. As expected, participants were more likely to think that the statements were true if they were in ‘more than’ style ($M = .42$, $SD = .22$) than if they were in ‘less than’ style ($M = .30$, $SD = .21$), $d = .43$. Neither the main effect of participant gender, $F(1, 77) = 2.26$, $p = .137$, nor the gender by framing interaction, $F(1, 77) = 0.51$, $p = .476$, were significant.

Certainty ratings. A 2 (framing: ‘more than’ vs. ‘less than’) by 2 (response: true vs. false) by 2 (participant gender: female vs. male) ANOVA with the first two variables being treated as within subjects variables revealed no effects, $F_s(1, 54) < 2.80$, $ps \geq .100$, $\eta^2_p < .05$. Considering that all ‘yes’-responses were factually incorrect, it is worth noting that participants felt equally certain about ‘yes’ responses ($M = 5.04$, $SD = 1.08$) and about ‘no’

responses ($M = 5.09$, $SD = 0.96$). This suggests that we were successful in creating a judgment task that was relatively difficult.

Discussion

In Study 6, participants were more likely to think that a comparison was true if it was framed in ‘more than’ rather than ‘less than’ style. This extends our previous support for the more-less asymmetry in several ways. First, Study 6 was concerned with absolute true/false guesses rather than agreement ratings. Second, just like Study 1a, it did not rely on student participants but on a heterogeneous sample of people recruited in public places. Third, pretesting insured that participants had no stereotypical expectations so that they had to think well about the statements.

Study 7

Studies 1 through 6 demonstrated a robust asymmetry in the use and in judgments of comparisons described via ‘more than’ versus ‘less than’ statements. We had predicted these asymmetries based on the assumptions that (a) ‘more than’ statements are easier to process than ‘less than’ statements and (b) people draw on the meta-cognitive experience of fluency associated with the easier processing of ‘more than’ statements when making social judgments (or on the experience of disfluency associated with a ‘less than’ framing, respectively). Although all 6 studies confirmed our hypothesis of a more-less asymmetry, their support for the fluency explanation was rather indirect. Study 7 tested the proposed mechanism more directly.

As outlined earlier, fluency effects arise because people use meta-cognitive experiences of (dis)fluency as information in judgments (Kelley & Rhodes, 2002; Schwarz & Clore, 1983). Experiences of fluency caused by one aspect of a stimulus (e.g., its rhyming form) are sometimes misattributed to another aspect (e.g., its truth value, McGlone & Tofigbakhsh, 2000). Hence, one intervention to mitigate cognitive fluency effects – and a way to test whether cognitive fluency plays a role in the observed effect – is to provide participants with an alternative source

to which they can attribute the experience of (dis)fluency (Bornstein & D'Agostino, 1994). For example, Lev-Ari and Keysar (2010) had English-speaking participants judge the truth of trivia statements spoken by native speakers of English versus non-native speakers with a mild or a heavy accent. The statements were considered less true if spoken by a non-native speaker than if spoken by a native speaker, particularly if the non-native speaker had a heavy accent (cf. Dixon, Mahoney, & Cocks, 2002). If the difficulty of processing accented speech was previously pointed out to participants, however, statements spoken with a mild accent were considered as true as statements spoken by a native speaker. The heavily accented speaker continued to be believed less than the others, suggesting that such a re-attribution paradigm can mitigate fluency effects but might not be able to eliminate them completely.

Hence, if people respond more favorably to 'more than' statements than to 'less than' statements because the latter are harder to process, warning participants in a 'less than' condition that the statements might be difficult to process should reduce the more-less asymmetry – even if this simple intervention might not completely eliminate the effect. We tested this prediction in the context of agreement with stated opinions. More specifically, we presented participants with the statements about gender differences used in Study 5. One-third of the participants read statements of the 'more than' type. The remaining two-thirds read statements of the 'less than' type. Within the latter group, one half were warned that the statements might be difficult whereas the other half was not. We predicted that participants would agree more with statements of the 'less than' type when they were warned that these would be difficult to process than when they were not. Based on Lev-Ari and Keysar (2010) and the robustness of the effects in our previous studies we did not expect that a simple warning would completely eradicate the adverse effect of disfluency, though. An a priori warning of difficulty should increase agreement with 'less than' statements compared to a no warning condition, but might not be enough to cause participants to agree with 'less than' statements as much as they agree with 'more than' statements.

Method

Participants. Participants were 130 Dutch-speaking Belgian students (86 women, 43 men, one participant who did not answer the gender question), aged 17 to 31 ($M = 19.62$; $SD = 2.18$) who took part either to fulfill a course requirement or for payment (4 € for this and another, unrelated study).

Materials, procedure, and design. The materials and the procedure were identical to Study 5, except for the following. All participants read stereotype-inconsistent statements. Approximately one third read ‘more than’ statements. Approximately two thirds read standard ‘less than’ statements. For about half of these, the instructions on the questionnaire included a sentence saying that some statements might be worded a bit strangely or might seem hard to evaluate and encouraging participants to try to give their view nonetheless. Participants filled out the questionnaire in groups of 2 to 10. However, to prevent participants from noticing different instructions and item wordings, all participants in one group session were in the same condition. We calculated mean agreement ratings over all statements. Our design thus included one dependent variable (agreement) and one between-subjects manipulation (framing) with three conditions: ‘more than’, ‘standard less than’, and ‘less than with warning’.

Results and Discussion

Framing affected agreement, $F(2, 127) = 22.55$, $p < .001$, $\eta_p^2 = 0.26$. A planned contrast comparing the ‘standard less than’ condition with the ‘less than with warning’ and the ‘more than’ condition revealed a significant difference, $t(127) = 5.25$, $p < .001$. Tukey post-hoc tests revealed greater agreement with ‘more than’ statements ($M = 3.27$, $SD = .55$, $n = 45$) than with ‘less than with warning’ statements ($M = 2.76$, $SD = .62$, $n = 42$), $p < .001$, and ‘standard less than’ statements ($M = 2.44$, $SD = .57$, $n = 32$), $p < .001$. Importantly, they also revealed greater agreement with ‘less than with warning’ statements than with ‘standard less than’ statements, $p = .037$. Study 7 thus shows that forewarning people against the difficulty of processing ‘less than’

statements mitigates their disagreement with these statements, revealing that the negative meta-cognitive experience of disfluency while processing ‘less than’ comparative statements is at least partially responsible for the more-less asymmetry.

General Discussion

Our research demonstrated a robust, general, and easily replicable more-less asymmetry in the use of, and in a variety of responses to comparative statements. We showed that people spontaneously use ‘more than’ statements more often than ‘less than’ statements (Study 1), like ‘more than’ statements better (Studies 2 & 3), agree more with ‘more than’ statements (Studies 4 & 5), and are more likely to consider factual ‘more than’ statements to be true (Study 6). We submit that cognitive fluency is an underlying mechanism that (at least partially) explains this asymmetry. Supporting this view, a manipulation that made people expect disfluency while processing ‘less than’ statements significantly reduced the more-less asymmetry (Study 7), suggesting that meta-cognitive experiences and their interpretation play an important role for the more-less asymmetry. Importantly, however, this does not exclude the possibility that other processes might contribute to effects as well (see below).

The more-less asymmetry is fundamentally different from the marked-unmarked asymmetry proposed by lexical marking theory. We demonstrated the more-less asymmetry using comparative statements about unmarked comparison dimensions or, if the comparison dimension might be considered marked, always mentioned the same pole. Our ‘more than’ and ‘less than’ statements thus did not differ in terms of markedness so that the more-less asymmetry is no epiphenomenon of an asymmetry caused by lexical markedness.

Implications

Our research is important for at least two reasons. First, it revealed a type of comparative framing effect that was not documented thus far. Second, it demonstrates the role of cognitive fluency in the processing of comparative statements. To the best of our knowledge, our research

provided the first evidence that simple syntactic features of statements affect cognitive fluency to such an extent that it in turn provokes observable psychological consequences. Although previous research has shown that the logically equivalent wording of statements in rhyming or non-rhyming form affects persuasiveness (McGlone & Tofigbakhsh, 2000), by using different words, these studies necessarily rely on statements with slightly different semantic content. In the present studies, the only differences were in using the parallel expressions ‘more than’ vs. ‘less than’ and in comparative focus (on the entity that possesses more vs. less of a given characteristic). In addition, by affecting the beauty or funniness of verses, rhymes presumably have stronger affective implications than the positive feeling caused by a more or less common comparative framing.

Going beyond this particular difference in comparative framing, the present research also sheds new light on the substantial body of research that has documented various effects of comparative framing since Tversky’s (1977) seminal work on this topic. For example, similarity judgments often differ depending on whether an entity A is compared to an entity B or whether B is compared to A (Hodges, 2005, Hodges & Hollenstein, 2001). People claim that others are more similar to them than that they are to others (Codol, 1987; Srull & Gaelick, 1983), and the degree to which people believe that they and their future are better than others or other people’s futures also depends on whether they compare the self to others or compare others to the self (Hoorens, 1995). Even preference judgments depend on framing such that responses to the question whether one prefers A to B often do not mirror responses to the question whether one prefers B to A (Hodges, 1998; Houston, Sherman, & Baker, 1989; Wänke, 1996).

Our findings differ from these effects in that we examined how people respond to descriptions of differences rather than having them judge the differences themselves. Yet, our findings have implications for this literature insofar as a fluency perspective may provide new insights into some of these well-established effects as well as generate new hypotheses for

further effects of comparative framing. For example, the extent to which people perceive similarities or differences between entities depends on whether a more prominent entity is compared to a less prominent one or vice versa (Tversky, 1977). This might in part be caused by implicit linguistic rules that state that, under normal circumstances, less prominent objects should be put in relation to more prominent ones rather than vice versa (Gleitman, Gleitman, Miller, & Ostrin, 1996). Accordingly, framings that follow this rule should be easier to process and might hence garner more agreement than alternative framings (see Roese, Sherman, & Hur, 1998), and inequalities between social groups might be perceived as more legitimate if the framing is easy to process and the difference hence sounds more ‘natural’ (Bruckmüller et al., 2012). In the same vein, the more-less asymmetry might contribute to the maintenance or change of group stereotypes. Stereotypes have often been defined as describing group differences (e.g. Biernat & Crandall, 1996; Martin, 1987; McCauley & Stitt, 1978) and hence might refer to one group possessing a given characteristic more or to another group possessing the same characteristic less. Stereotype-consistent or -inconsistent information can also take the form of ‘more than’ or ‘less than’ statements. Thus, stereotype endorsement as well as the extent to which counter-stereotypical information leads to attitude change may crucially depend on comparative framing and, consequently, how easy it is to process the respective information (for a similar argument, see Bruckmüller et al., 2012).

However, previous research on the comparative framing of group differences also suggests some possible boundary conditions of the more-less asymmetry. For instance, people habitually tend to frame gender differences by comparing women to men rather than men to women (Miller, Taylor, & Buck, 1991), or more generally, to compare lower-status groups to higher-status groups (e.g., Hegarty & Bruckmüller, 2013). Hence, while the expression ‘men earn more than women’ matches implicit preferences for a ‘more than’ framing, the expression ‘women earn less than men’ matches implicit preferences for comparing women to men, which

should also facilitate cognitive processing. Whether and when other comparative framing effects might overpower the more-less asymmetry demonstrated here is, of course, an empirical question.

Beyond the comparative framing and the fluency literature, the more-less asymmetry also has practical implications in the domain of persuasion and methodological implications in the domain of self-report measurement instruments. First, the more-less asymmetry suggests that ‘more than’ messages are more convincing than ‘less than’ messages. Hence, in commercials for medicines, for instance, stating that a medicine has less side-effects than the competition may be less effective than stating that the competition has more side-effects. The more-less asymmetry may even affect self-persuasion, the phenomenon that may occur when people engage in counter-attitudinal advocacy or endorse counter-attitudinal statements (e.g., Festinger & Carlsmith, 1959; Aronson, 1999). It implies indeed that attitude change may come about more easily when people are invited to respond to counter-attitudinal ‘more than’ statements than to counter-attitudinal ‘less than’ statements. Further, if our cognitive fluency explanation is valid, any variation in comparative statements that affects ease of processing should also affect the persuasiveness of these statements.

Limitations

Our research was admittedly limited both in terms of measures tapping into the underlying process and in terms of an exploration of boundary conditions to the more-less asymmetry. We did not include measures that could directly reveal a greater disfluency in processing ‘less than’ statements than in processing ‘more than’ statements (e.g., reaction times), nor did we seek for specific circumstances in which ‘less than’ statements would be more frequently used and fluently processed (e.g. in descriptions of small quantities). As we were the first to examine the more-less asymmetry, however, our main focus was on establishing the phenomenon.

Still, we did more than demonstrating the more-less asymmetry. Using a well-established strategy (e.g., Bornstein & D'Agostino, 1994; Lev-Ari & Keysar, 2010; Schwarz & Clore, 1983), we tested the effect of an intervention that should reduce the more-less asymmetry if this asymmetry was caused by participants' interpretation of their meta-cognitive experience of (dis-) fluency – and found that this intervention did reduce the otherwise very robust asymmetry. We therefore conclude that there is good reason to assume that differential cognitive fluency provokes differential responses to 'more than' and 'less than' statements (even if other processes might be involved).

Admittedly, the intervention designed to prepare participants for the cognitive disfluency involved in processing 'less than' statements reduced but not totally eradicated the more-less asymmetry in agreement. This finding may be interpreted in at least two manners. One is that the warning that participants got about the statements perhaps being a bit strange was too subtle to make them completely attribute their cognitive disfluency experience to a cause other than disagreement with the statement. The warning was subtle indeed: It took the form of one sentence occurring after the general instruction but before participants filled out their age and gender and then moved to the explanation of the response scale. Moreover, it said that the statements might be 'a bit' strange, which is an understatement given the unusual nature of 'less than' statements.

The other explanation is that the more-less asymmetry is multiply determined, with cognitive (dis-)fluency being just one causal mechanism. Some alternative mechanisms may be readily dismissed. The asymmetry does not depend on the extent to which the target and referent roles are conform normative expectancies (cf. Study 4a, 4b, and 5, in which the assignment of target and referent roles was counterbalanced) nor on the extent to which the statements put the more desirable entity in the target role (cf. Study 3, in which the statements described desirable and undesirable elements of the target and the referent, and Study 4a, 4b, and

5, where participants responded to statements about desirable and undesirable characteristics). Still, a number of other mechanisms may be at play. For instance, people may associate ‘more than’ and ‘less than’ with a vertical or a horizontal dimension (with more = high/right, and less = low/left) and for some reason feel more comfortable with putting or encountering the ‘higher’ or the ‘right’ entity in the target role of a comparative statement. It is also possible that because of a preponderance of positive elements in natural language (cf. Boucher & Osgood, 1969) people intuitively come to associate the expression ‘more’ with ‘more of something good’, thus producing the observed asymmetry. No matter what future studies reveal about the role of these mechanisms, however, our research suggests that cognitive (dis)fluency at least contributes to the more-less asymmetry.

Conclusion

We demonstrated a general more-less asymmetry in the use, interpretation, and judgment of comparative statements. This asymmetry is at least partly due to ‘more than’-statements being easier to process than ‘less than’-statements. People therefore use ‘more than’ statements more frequently, agree with them more, more readily believe them, and like them better. Rather than saying that the field of comparative verbal communication was less complete before we did our research, therefore, we would like to say that the field has become more complete with it.

Notes

¹ We thank an anonymous reviewer for pointing this out to us.

² Participants who were asked how women differ from men focused more on women (53.0%) than on men (34.0%) and vice versa (29.1% and 52.7%, respectively) for participants who were asked how men differ from women, $\chi^2(1, N = 435) = 24.25, p < .001$.

³ A manipulation check confirmed that participants followed instructions. They listed more desirable than undesirable traits when they were free to decide which traits to list, ($M_{desirable} = 0.56, SD = 0.22; M_{undesirable} = 0.26, SD = 0.18$), $t(74) = 7.65, p < .001$, as well as in the desirable characteristics condition ($M_{desirable} = 0.79, SD = 0.22; M_{undesirable} = 0.08, SD = 0.15$), $t(77) = 18.83, p < .001$. When they were instructed to list undesirable traits, they listed more undesirable than desirable traits ($M_{desirable} = 0.26, SD = 0.26; M_{undesirable} = 0.64, SD = 0.29$), $t(77) = 6.42, p < .001$; main effect of valence: $F(1, 209) = 40.02, p < .001, \eta^2 = .16$; valence by instruction interaction: $F(1, 209) = 73.81, p < .001, \eta^2 = .41$.

⁴ We pretested the perceived masculinity or femininity and the valence of the characteristics. Details can be obtained from the first author.

⁵ There were main effects of desirability, $F(1, 318) = 68.71, p < .001, \eta_p^2 = 0.18$, consistency, $F(1, 318) = 969.40, p < .001, \eta_p^2 = 0.75$, and participant gender, $F(1, 318) = 9.66, p = .002, \eta_p^2 = 0.29$, and an interaction of the latter two variables, $F(1, 318) = 4.25, p = .04, \eta_p^2 = 0.01$. Participants agreed more with stereotype-consistent than with stereotype-inconsistent statements. Men agreed more with stereotype-inconsistent statements than women ($M_{men} = 3.27, SD = 0.52; M_{women} = 3.01, SD = 0.54$), $t(318) = 3.79, p < .001$, with stereotype-consistent statements not yielding a significant difference ($M_{men} = 4.25, SD = 0.49; M_{women} = 4.13, SD = 0.58$), $t(318) = 1.66, p = .098$.

⁶ Participants agreed more with statements about undesirable characteristics ($M = 3.66, SD = 0.61$) than about desirable ones ($M = 3.55, SD = 0.55$), $F(1, 314) = 8.92, p = .003$,

$\eta_p^2 = 0.28$. They agreed more with statements ascribing ‘male’ characteristics to youngsters or ‘female’ characteristics to old people ($M = 3.70$, $SD = 0.59$) than vice versa ($M = 3.52$, $SD = 0.55$), $F(1, 314) = 54.12$, $p < .001$, $\eta_p^2 = 0.15$. The latter effect was significant for desirable characteristics ($M_{consistent} = 3.71$, $SD = 0.61$; $M_{inconsistent} = 3.40$, $SD = 0.55$), $t(319) = 14.30$, $p < .001$, but not for undesirable ones ($M_{consistent} = 3.69$, $SD = 0.68$; $M_{inconsistent} = 3.64$, $SD = 0.64$), $t(318) = 1.24$, $p = .22$; interaction: $F(1, 314) = 24.78$, $p < .001$, $\eta_p^2 = 0.07$.

⁷ Degrees of freedom are somewhat smaller than those reported in Study 4a because a few participants did not provide ratings for all statements.

⁸ Because each stereotype-desirability combination was represented by only 5 characteristics we no longer included stereotype of origin as a within-subjects variable. Because of the limited number of male participants we did not include participant gender as an independent variable.

⁹ Participants agreed more with stereotype-consistent comparisons ($M = 4.44$, $SD = 0.73$) than with stereotype-inconsistent ones ($M = 3.19$, $SD = 0.69$), $F(1, 56) = 53.19$, $p < .001$, $\eta_p^2 = 0.49$. The difference was greater for undesirable characteristics ($M_{inconsistent} = 3.06$, $SD = 0.84$; $M_{consistent} = 4.65$, $SD = 0.72$), $t(58) = 7.86$, $p < .001$, $d = 2.03$; than for desirable ones ($M_{inconsistent} = 3.32$, $SD = 0.64$; $M_{consistent} = 4.24$, $SD = 0.85$), $t(58) = 4.74$, $p < .001$, $d = 1.22$; interaction: $F(1, 56) = 18.59$, $p < .001$, $\eta_p^2 = 0.25$.

References

- Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the tribes of fluency to form a metacognitive nation. *Personality and Social Psychology Review*, 13, 219-235. doi: 10.1177/1088868309341564
- Aronson, E. (1999). The power of self-persuasion. *American Psychologist*, 54, 875-884. doi: 10.1037/h0088188
- Biernat, M., & Crandall, C. S. (1996). Creating stereotypes and capturing their content. *European Journal of Social Psychology*, 26, 867-898. doi:10.1002/(SICI)1099-0992(199611)26:6<867::AID-EJSP792>3.0.CO;2-V
- Bornstein, R. F. & D'Agostino, P. R. (1994). The attribution and discounting of perceptual fluency: Preliminary tests of a perceptual fluency/attributional model of the mere exposure effect. *Social Cognition*, 12, 103–128. doi: 10.1521/soco.1994.12.2.103
- Boucher, J., & Osgood, C. E. (1969). The Pollyanna hypothesis. *Journal of Verbal Learning & Verbal Behavior*, 8, 1–8.
- Bruckmüller, S., & Abele, A. E. (2010). Comparison focus in intergroup comparisons: Who we compare to whom influences who we see as powerful and agentic. *Personality and Social Psychology Bulletin*, 36, 1424-1435. doi: 10.1177/0146167210383581
- Bruckmüller, S., Hegarty, P., & Abele, E.E. (2012). Framing gender differences: Linguistic normativity affects perceptions of power and gender stereotypes. *European Journal of Social Psychology*, 42, 210-218. doi: 10.1002/ejsp.858
- Carpenter, P.A. (1974). On the comprehension, storage, and retrieval of comparative sentences. *Journal of Verbal Learning and Verbal Behavior*, 13, 401-411. doi: 10.1016/S0022-5371(74)80018-6
- Clark, H.H. (1969). Linguistic processes in deductive reasoning. *Psychological Review*, 76, 387-404. doi: 10.1037/h0027578

- Clark, H.H. (1970). Comprehending comparatives. In: G.B. Flores d'Arcais & W.J.M. Levelt (Eds.), *Advances in psycholinguistics* (pp. 294-306 & 320-321). Amsterdam: North-Holland.
- Clark, H.H. (1974). Semantics and comprehension. In: T.A. Sebeok (Ed.). *Current trends in linguistics. Vol. 12: Linguistics and adjacent arts and sciences* (pp. 1291-1428). The Hague: Mouton.
- Codol, J.P. (1987). Comparability and incomparability between oneself and others: Means of differentiation and comparison reference points. *Cahiers de Psychologie Cognitive/Current Psychology of Cognition*, 7, 87-105.
- Dixon, J. A., Mahoney, B., & Cocks, R. (2002). Accents of guilt? Effects of regional accent, race, and crime type on attributions of guilt. *Journal of Language and Social Psychology*, 21, 162-168. doi: 10.1177/02627X02021002004
- Festinger, L., & Carlsmith, J. M. (1959). Cognitive consequences of forced compliance. *Journal of Abnormal and Social Psychology*, 58, 203-210. doi: 10.1037/h0041593
- Filkuková, P., & Klempe, S. H. (2013). Rhyme as reason in commercial and social advertising. *Scandinavian Journal of Psychology*, 54, 423-431. doi: 10.1111/sjop.12069
- Fleming, J. S., & Courtney, B. E. (1984). The dimensionality of self-esteem: II. Hierarchical facet model for revised measurement scales. *Journal of Personality and Social Psychology*, 46, 404-421.
- Flores d'Arcais, G.B. (1970). Linguistic structure and focus of comparison in processing of comparative sentences. In: G.B. Flores D'Arcais & W.J.M. Levelt (Eds.). *Advances in psycholinguistics* (pp. 307-321). Amsterdam: North-Holland.
- French, P. (1981). Constructing comparative sentences: Linguistic marking and affect. *Journal of Psycholinguistic Research*, 10, 529-536. doi: 10.1007/BF01067291
- Gleitman, L. R.,

- Gleitman, H., Miller, C., & Ostrin, R. (1996). Similar, and similar concepts. *Cognition*, 58, 321-376. doi:10.1016/0010-0277(95)00686-9
- Greifeneder, R., Alt, A., Bottenberg, K., Seele, T., Zelt, S., & Wagener, D. (2010). On writing legibly processing fluency systematically biases evaluations of handwritten material. *Social Psychological and Personality Science*, 1, 230-237. doi: 10.1177/1948550610368434
- Hansen, J., Dechêne, A., & Wänke, M. (2008). Discrepant fluency increases subjective truth. *Journal of Experimental Social Psychology*, 44, 687-691. doi: 10.1016/j.jesp.2007.04.005
- Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social psychology*, 60, 895-910.
- Hegarty, P., & Pratto, F. (2001). The effect of social category norms and stereotypes on explanations for intergroup differences. *Journal of Personality and Social Psychology*, 80, 723-735. doi: 10.1037/0022-3514.80.5.723
- Hegarty, P., & Bruckmüller, S. (2013). Asymmetric explanations of group differences: Experimental evidence of Foucault's disciplinary power. *Social and Personality Psychology Compass*, 7, 176-186. doi: 10.1111/spc3.12017
- Higgins, E. (1977). The varying presuppositional nature of comparatives. *Journal of Psycholinguistic Research*, 6, 203-222. doi: 10.1007/BF01068020
- Hodges, S.D. (1998). Reasons for the referent: Reducing direction of comparison effects. *Social Cognition*, 16, 367-390. doi: 10.1521/soco.1998.16.4.367
- Hodges, S.D. (2005). A feature-based model of self-other comparisons. In: M.D. Alicke, D.A. Dunning, & J.L. Krueger (Eds.). *The self in social judgment* (pp. 131-153). New York: Psychology Press.
- Hodges, S.D., & Hollenstein, T. (2001). Direction of comparison in typicality judgments. *Social Cognition*, 19, 601-623. doi: 10.1521/soco.19.6.601.20887

- Holbrook, A. L., Krosnick, J. A., Carson, R. T., & Mitchell, R. C. (2000). Violating conversational conventions disrupts cognitive processing of attitude questions. *Journal of Experimental Social Psychology*, 36, 465-494. doi: 10.1006/jesp.1999.1411
- Holyoak, K.J. & Gordon, P.C. (1983). Social reference points. *Journal of Personality and Social Psychology*, 44, 881-887. doi: 10.1037/0022-3514.44.5.881
- Hoorens, V. (1995). Self-favoring biases, self-presentation and the self-other asymmetry in social comparison. *Journal of Personality*, 63, 793-817. doi: 10.1111/j.1467-6494.1995.tb00317
- Houston, D.A., Sherman, S.J., & Baker, S.M. (1989). The influence of unique features and direction of comparison on preferences. *Journal of Experimental Social Psychology*, 25, 121-141. doi: 10.1016/0022-1031(89)90008-5
- Hunter, I.M.L. (1957). The solving of three-term series problems. *British Journal of Psychology*, 48, 286-298. doi: 10.1111/j.2044-8295.1957.tb00627
- Huttenlocher, J., & Higgins, E.T. (1971). Adjectives, comparatives, and syllogisms. *Psychological Review*, 78, 487-504. doi: 10.1037/h0031858
- Karylowski, J.J. (1989). Trait prototypicality and the asymmetry effect in self-other similarity judgments. *Journal of Social Behavior and Personality*, 4, 581-586.
- Karylowski, J.J. (1990). Social reference points and accessibility of trait-related information and self-other similarity judgments. *Journal of Personality and Social Psychology*, 58, 975-983. doi: 10.1037/0022-3514.58.6.975
- Kelley, C. M., & Rhodes, M. G. (2002). Making sense and nonsense of experience: Attributions in memory and judgment. In B. H. Ross (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 41, pp. 293-320). San Diego, CA: Academic Press.

- Laham, S. M., Koval, P., & Alter, A. L. (2012). The name-pronunciation effect: Why people like Mr. Smith more than Mr. Colquhoun. *Journal of Experimental Social Psychology*, 48, 752-756. doi: 10.1016/j.jesp.2011.12.002
- Lev-Ari, S., & Keysar, B. (2010). Why don't we believe non-native speakers? The influence of accent on credibility. *Journal of Experimental Social Psychology*, 46, 1093-1096, doi: 10.1016/j.jesp.2010.05.025
- Martin, C. L. (1987). A ratio measure of sex stereotyping. *Journal of Personality and Social Psychology*, 52, 489-499. doi:10.1037/0022-3514.52.3.489
- McCauley, C., & Stitt, C. L. (1978). An individual and quantitative measure of stereotypes. *Journal of Personality and Social Psychology*, 36, 929-940. doi:10.1037/0022-3514.36.9.929
- McGlone, M. S., & Tofiqbakhsh, J. (2000). Birds of a feather flock conjointly (?): Rhyme as reason in aphorisms. *Psychological Science*, 11, 424-428. doi: 10.1111/1467-9280.00282
- Miller, D.T., Taylor, B., & Buck, M.L. (1991). Gender gaps: Who needs to be explained? *Journal of Personality and Social Psychology*, 61, 5-12. doi: 10.1037/0022-3514.61.1.5
- Newman, E. J., Sanson, M., Miller, E. K., Quigley-McBride, A., Foster, J. L., Bernstein, D. M., & Garry, M. (2014). People with Easier to Pronounce Names Promote Truthiness of Claims. *PloS one*, 9(2), e88671. doi: 10.1371/journal.pone.0088671
- Oppenheimer, D. M. (2008). The secret life of fluency. *Trends in Cognitive Sciences*, 12, 237-241. doi: 10.1016/j.tics.2008.02.014
- Pratto, F., Korchmaros, J. D., & Hegarty, P. (2007). When race and gender go without saying. *Social Cognition*, 25, 221-247. doi: 10.1521/soco.2007.25.2.221
- Reber, R., & Schwarz, N. (1999). Effects of perceptual fluency on judgments of truth. *Consciousness and Cognition*, 8, 338-342. doi 10.1006/ccog.1999.0386

- Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: is beauty in the perceiver's processing experience? *Personality and Social psychology Review*, 8, 364-382. doi: 10.1207/s15327957pspr0804_3
- Reber, R., Winkielman, P., & Schwarz, N. (1998). Effects of perceptual fluency on affective judgments. *Psychological Science*, 9, 45-48. doi: 10.1111/1467-9280.00008
- Roese, N. J., Sherman, J. W., & Hur, T. (1998). Direction of comparison asymmetries in relational judgement: The role of linguistic norms. *Social Cognition*, 16, 353-362. doi: 10.1521/soco.1998.16.3.353
- Scholl, S. G., Greifeneder, R., & Bless, H. (2014). When fluency signals truth: Prior successful reliance on fluency moderates the impact of fluency on truth judgments. *Journal of Behavioral Decision Making*, 27, 268-280. doi: 10.1002/bdm.1805
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, 45, 513-523. doi: 10.1037/0022-3514.45.3.513
- Segui, J., & Fourment, M.-C. (1979). Présupposition et inférence: Une étude des structures comparatives. *L'Année Psychologique*, 79, 105-122.
- Shah, A. K., & Oppenheimer, D. M. (2007). Easy does it: The role of fluency in cue weighting. *Judgment and Decision Making*, 2, 371-379.
- Srull, T. K., & Gaelick, L. (1983). General principles and individual differences in the self as a habitual reference point: An examination of self-other judgments of similarity. *Social Cognition*, 2, 108-121.
- Topolinski, S., & Strack, F. (2009). Scanning the “Fringe” of consciousness: What is felt and what is not felt in intuitions about semantic coherence. *Consciousness and Cognition*, 18, 608–618. doi:10.1016/j.concog.2008.06.002

- Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology*, 12, 97-136. doi: 10.1016/0010-0285(80)90005-5
- Treisman, A., & Gormican, S. (1988). Feature analysis in early vision: Evidence from search asymmetries. *Psychological Review*, 95, 15-48. doi: 10.1037/0033-295X.95.1.15
- Tversky, A. (1977). Features of similarity. *Psychological Review*, 84, 327-352.
- Unkelbach, C. (2007). Reversing the truth effect: learning the interpretation of processing fluency in judgments of truth. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 33, 219-230. doi: 10.1037/0278-7393.33.1.219
- Wänke, M. (1996). Comparative judgments as a function of the direction of comparison versus word order. *Public Opinion Quarterly*, 60, 500-409. doi: 10.1086/297761
- Wänke, M., & Reuter, L. (2010). Direction-of-comparison effects: How and why comparing apples with oranges is different from comparing oranges with apples. In Keren, G. (Eds.), *Perspectives on Framing* (pp. 177-194). New York and Hove: Psychology Press.
- West, K., & Bruckmüller, S. (2013). Nice and easy does it: How perceptual fluency moderates the effectiveness of imagined contact. *Journal of Experimental Social Psychology*, 49, 254-262. doi: 10.1016/j.jesp.2012.11.007
- Winkielman, P., & Cacioppo, J. T. (2001). Mind at ease puts a smile on the face: psychophysiological evidence that processing facilitation elicits positive affect. *Journal of Personality and Social Psychology*, 81, 989. doi: 10.1037/0022-3514.81.6.989
- Winkielman, P., Schwarz, N., Fazendeiro, T., & Reber, R. (2003). The hedonic marking of processing fluency: Implications for evaluative judgment. In: J. Musch, & K.C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion* (pp. 189-217). Mahwah, NJ: Lawrence Erlbaum.

Figure 1: Effect of framing in an article about differences between allergy medicines on evaluative judgments of aspects of the article and its author (Study 3).

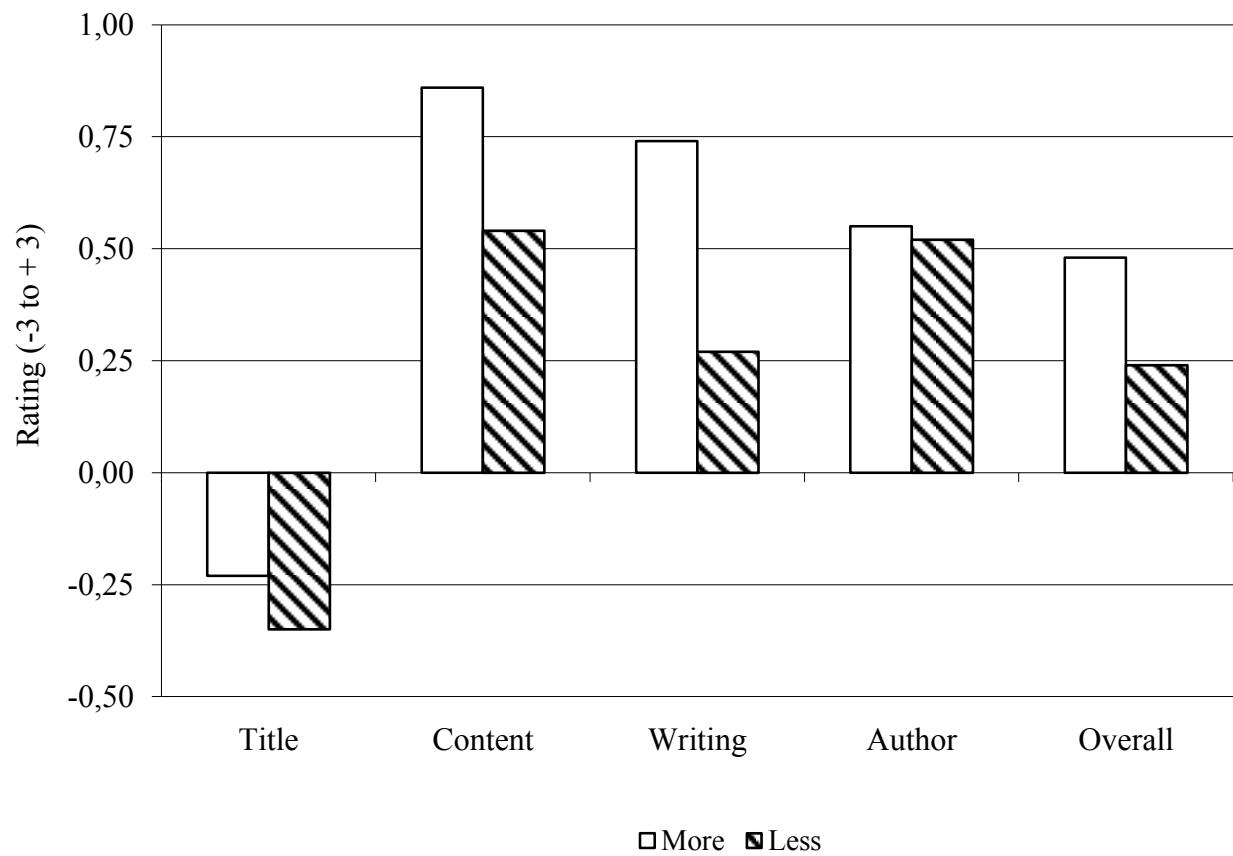


Figure 2: Mean agreement of male and female participants with comparative statements about men and women as a function of framing (more than, less than) and desirability (desirable, undesirable) of the characteristic (Study 4a).

